

1 **CLAIMS**

2 1. A method for operating a network system having a content provider
3 which provides content over a network through local service providers to multiple
4 content rendering units, the method comprising the following steps:

5 identifying a peak time when a plurality of the content rendering units are
6 likely to request the content supplied by the content provider;

7 sending at least some of the content from the content provider to the local
8 service provider prior to the peak time; and

9 storing the content received from the content provider at the local service
10 provider for use during the peak time.

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12 2. A method as recited in claim 1, wherein the sending step is performed
13 without being requested by the content rendering units.

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15 3. A method as recited in claim 1, wherein the content comprises
16 streaming audio or video data.

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18 4. A method as recited in claim 1, further comprising the step of
19 requesting, by the local service provider, the content based on the results of the
20 identifying step.

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22 5. A method as recited in claim 1, and further comprising:
23 monitoring usage patterns of the content;
24 scheduling early sending of the content at a time prior to the peak time
25 based on the usage patterns.

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2 6. A method as recited in claim 1, and further comprising the step of
3 serving the content from the local service provider to requesting content rendering
4 units during the peak time.

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6 7. A method as recited in claim 1, wherein:
7 the identifying step comprises designating a peak time in terms of discrete
8 time slots as covering an ending portion of at least one time slot and a beginning
9 portion of at least one subsequent time slot; and

10 the sending step comprises sending the content that is likely to be requested
11 in the subsequent time slot prior to the peak time.

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13 8. A method as recited in claim 1, and further comprising the following
14 steps:

15 customizing a set of prioritized content according to requests made by the
16 content rendering units; and

17 selectively sending the set of prioritized content to the local service
18 provider prior to the peak time.

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20 9. A method as recited in claim 1, and further comprising the step of
21 assigning a time-to-live tag to the content to indicate when the content is expected
22 to be updated.

1 10. A method as recited in claim 1, and further comprising the step of
2 estimating, at the local service provider, a time-to-live tag for the content received
3 from the content provider to indicate when the content is expected to be updated.
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5 11. A method as recited in claim 10, wherein the estimating step
6 comprises deriving the time-to-live tag based upon a time since the content was
7 last updated.
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9 12. In a network system having a content provider which provides
10 content over a network through a local service provider to multiple content
11 rendering units, a method for operating a local service provider comprising the
12 following steps:

13 monitoring usage patterns to detect highly requested content;

14 identifying from the usage patterns a peak time when a plurality of the
15 content rendering units are likely to request the content;

16 scheduling delivery of the highly requested content at a scheduled time
17 prior to the peak time;

18 receiving the highly requested content from the content provider at the
19 scheduled time prior to the peak time; and

20 storing the highly requested content received from the content provider for
21 use during the peak time.
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23 13. A method as recited in claim 12, wherein the content comprises
24 streaming audio or video data.
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1 14. A method as recited in claim 12, and further comprising the step of
2 modifying target specifications, which are used by the local service provider to
3 reference the content stored at the content provider, to instead reference the
4 content stored at the local service provider.

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6 15. A method as recited in claim 12, and further comprising the step of
7 serving the stored content to requesting content rendering units during the peak
8 time.

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10 16. A method as recited in claim 12, and further comprising the step of
11 estimating, at the local service provider, a time-to-live tag for the content received
12 from the content provider to indicate when the content is expected to be updated.

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14 17. A method as recited in claim 16, wherein the estimating step
15 comprises deriving the time-to-live tag based upon a time since the content was
16 last updated.

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18 18. A computer programmed to perform the steps in the method as
19 recited in claim 16.

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21 19. A method for operating a network system having a content provider
22 which provides content through a local service provider to multiple content
23 rendering units, the content being provided from the content provider to the local
24 service provider over a first network, the method comprising the following steps:
25

1 distributing supplemental content from the content provider to the local
2 service provider over a second network; and

3 storing selected portions of the supplemental content received from the
4 content provider in a cache at the local service provider for use in serving the
5 content rendering units.

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7 20. A method as recited in claim 19, wherein the supplemental content
8 comprises streaming audio or video data.

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10 21. A method as recited in claim 19 wherein the second network
11 comprises a satellite network and the distributing step comprises the step of
12 broadcasting the supplemental content.

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14 22. A method as recited in claim 19, and further comprising the step of
15 choosing the selected portions of the supplemental content to be stored at the local
16 service provider based upon usage patterns exhibited by the content rendering
17 units.

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19 23. A method as recited in claim 19, and further comprising the step of
20 serving the distributed content from the local service provider to requesting
21 content rendering units.

1 24. A method as recited in claim 19, and further comprising the
2 following steps:

3 identifying a peak time when a plurality of the content rendering units are
4 likely to request the content stored at the content provider; and
5 distributing the supplemental content from the content provider to the local
6 service provider over the second network prior to the peak time.

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8 25. A method as recited in claim 19, and further comprising the step of
9 assigning a time-to-live tag to the supplemental content to indicate when the
10 content is expected to be updated.

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12 26. A method as recited in claim 19, and further comprising the step of
13 estimating, at the local service provider, a time-to-live tag for the supplemental
14 content received from the content provider to indicate when the supplemental
15 content is expected to be updated.

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17 27. A method as recited in claim 26, wherein the estimating step
18 comprises deriving the time-to-live tag based upon a time since the supplemental
19 content was last updated.

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21 28. A system for providing content to user content rendering units,
22 comprising:

23 a content provider having storage for storing the content;
24 at least one local service provider to facilitate access to the content stored at
25 the content provider on behalf of the content rendering units;

1 a distribution network interconnecting the program provider and the local
2 service provider; and

3 the local service provider being configured to request certain content from
4 the content provider prior to a peak time when multiple content rendering units are
5 likely to request the content and to cache the content received from the content
6 provider for serving to requesting content rendering units during the ensuing peak
7 time.

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9 29. A system as recited in claim 28, wherein the local service provider
10 using target specifications to request the content stored at the content provider for
11 serving to the content rendering units, the local service provider modifying the
12 target specifications to reference the content cached at the local service provider
13 instead of referencing that same content at the content provider.

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15 30. A system as recited in claim 28, wherein the content provider
16 assigns a time-to-live tag to the content to indicate when the content is expected to
17 be updated.

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19 31. A system as recited in claim 28, wherein the local service provider is
20 configured to estimate a time-to-live tag for the content to indicate when the
21 content is expected to be updated.

1 32. A system as recited in claim 28, and further comprising at least one
2 content rendering unit connected to the local service provider to facilitate access to
3 the content served by the content provider, the local service provider serving the
4 content cached locally to the content rendering unit during the peak time.
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6 33. A system for providing content to user content rendering units,
7 comprising:

8 a content provider having storage for storing the content;
9 at least one local service provider to facilitate access to the content stored at
10 the content provider on behalf of the content rendering units;
11 an interactive network interconnecting the content provider and the local
12 service provider;
13 a broadcast network;
14 the content provider being configured to broadcast at least some of the
15 content over the broadcast network to the local service provider; and
16 the local service provider being configured to cache the broadcasted content
17 for serving to requesting content rendering units.
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19 34. A system as recited in claim 33, wherein the broadcast network
20 comprises a satellite network.
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1 35. A system as recited in claim 33, wherein the local service provider
2 uses target specifications to request the content stored at the content provider for
3 serving to the content rendering units, the local service provider being configured
4 to modify the target specifications to reference the broadcasted content cached at
5 the local service provider instead of referencing that same content at the content
6 provider.

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8 36. A system as recited in claim 33, wherein the content provider
9 assigns a time-to-live tag to the broadcasted content to indicate when the content is
10 expected to be updated.

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12 37. A system as recited in claim 33, wherein the local service provider is
13 configured to estimate a time-to-live tag for the broadcasted content to indicate
14 when the broadcasted content is expected to be updated.

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16 38. A system as recited in claim 33, and further comprising at least one
17 content rendering unit connected to the local service provider to facilitate access to
18 the content served by the content provider, the local service provider serving the
19 content cached locally to the content rendering unit.
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1 39. A local service provider for facilitating delivery of continuous data
2 content from a content provider to individual content rendering units, the content
3 serving unit comprising:

4 a computer programmed to detect a peak time when the content rendering
5 units are likely to request the particular target resource and to schedule a request
6 for the particular target resource at a selected time prior to the peak time;

7 a cache memory to store the particular target resource received from the
8 content provider in response to the scheduled requests;

9 a continuous media server to store any continuous data files referenced in
10 the particular target resource; and

11 the computer being further programmed to serve the particular target
12 resource stored in the cache memory to a content rendering unit during the peak
13 time, and if requested by the content rendering unit, to initiate transmission of a
14 continuous data file from the continuous media server that is referenced in the
15 target resource.

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17 40. A local service provider as recited in claim 39, wherein the target
18 resource in the cache memory contains target specifications to remote locations
19 where the continuous data files are stored remotely from the content serving unit,
20 and the computer is programmed to change the target specifications within the
21 cached target resource to reference the continuous data files stored in the
22 continuous media server.

1 41. A local service provider as recited in claim 39, wherein the
2 computer is programmed to estimate a time-to-live tag for the target resources
3 received from the content provider to indicate when the target resources are
4 expected to be updated.

5
6 42. A content serving unit for facilitating delivery of content from a
7 content provider to individual content rendering units, the content serving unit
8 comprising:

- 9 a computer;
10 a storage medium connected to the computer;
11 a network port responsive to the computer to request and receive content
12 from the content provider over a network;
13 a receiver to receive a signal from the content provider, the signal carrying
14 additional content; and
15 the computer being programmed to store the additional content received at
16 the receiver in the storage medium.

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18 43. A content serving unit as recited in claim 42, wherein the computer
19 is programmed to monitor usage patterns of the content and to schedule requests
20 for the content so that the content is received from the content provider at a time
21 prior to the peak time.

1 44. A content serving unit as recited in claim 42, wherein the computer
2 is programmed to serve the additional content stored in the storage medium to a
3 content rendering unit in response to a request from the content rendering unit.

4
5 45. A content serving unit as recited in claim 42, further comprising:
6 a memory to store target specifications for referencing the content at the
7 content provider; and
8 the computer being programmed to change the target specifications to
9 reference the content stored in the storage medium instead of referencing that same
10 content at the content provider.

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12 46. A content serving unit as recited in claim 42, wherein:
13 the network port comprises a connector compatible with a wire-based
14 communications network; and
15 the receiver comprises a receiver capable of receiving signals conveyed
16 through a wireless medium.

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18 47. A content serving unit as recited in claim 42, wherein the computer
19 is programmed to estimate a time-to-live tag for the content received from the
20 content provider to indicate when the content is expected to be updated.

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22 48. A content provider, comprising:
23 a storage system to store content;
24 a server connected to the storage system to serve the content to requesting
25 clients; and

1 the server being programmed to serve early at least some of the content to
2 the clients prior to a peak time when the clients are likely to request the content.

3
4 49. A content provider as recited in claim 48, wherein the server is
5 programmed to assign a time-to-live tag to the content to indicate when the content
6 is expected to be updated.

7
8 50. A content provider as recited in claim 48, wherein the server serves
9 multiple clients, the server being programmed to serve early different sets of
10 content for different ones of the clients.

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12 51. A content provider, comprising:
13 a storage system to store content;
14 a server connected to the storage system to serve the content to requesting
15 clients;
16 a network port adapted for connection to a network, the server serving the
17 content through the network port to the clients in response to requests from those
18 clients; and
19 a transmitter, responsive to the server, to transmit content over a second
20 network to the clients.

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22 52. A content provider as recited in claim 51, wherein:
23 the network port comprises a connector compatible with a wire-based
24 communications network; and
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1 the transmitter comprises a transmitter capable of transmitting signals over
2 a wireless medium.
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